

2.3 Area and Profit—What's the Connection?

In the next problem, you will explore two familiar situations that have an interesting connection.

Tony and Paco will operate the water tube concession stand at Water City. Tony is responsible for designing the building that will store the rafts. Paco is responsible for deciding the rental fee for the tubes.

Problem 2.3 Using Equations

- A.** Every concession stand must have a rectangular floor space and a perimeter of 88 meters. Tony wants the greatest area possible.
1. Write an equation for the area in terms of the length.
 2. What is the maximum area for the rectangular floor space?
- B.** Paco knows that on a typical day, the number of tube rentals n is related to the price to rent each tube p . Records from other water park locations suggest:
- If the tubes are free (no price), there will be 54 rentals.
 - Each increase of \$1 in the price will result in one less tube rented.

Paco uses this information to write the following equations:

- Equation 1: $n = 54 - (1)p$
 - Equation 2: $I = np$, where I is the daily income
1. Do these equations make sense? Explain.
 2. Write an equation for income in terms of the number of rentals n .
 3. The expenses for storage and maintenance of the rented tubes are \$10 per day. Write an equation for daily profit D in terms of the number of rentals n .



4. Compare the equation in part (3) to the equation in Question A, part (1).
5. What number of rentals produces the maximum daily profit? What is the maximum profit? What rental price produces the maximum daily profit?

ACE Homework starts on page 28.

Did You Know?

The calculation of the quarterback rating in the National Football League (NFL™) uses a series of equations:

$$\text{Completion Rating: CR} = 5 \left(\frac{\text{completions}}{\text{attempts}} \right) - 1.5$$

$$\text{Yards Rating: YR} = \frac{\frac{\text{yards}}{\text{attempts}} - 3}{4}$$

$$\text{Touchdown Rating: TR} = 20 \left(\frac{\text{touchdowns}}{\text{attempts}} \right)$$

$$\text{Interception Rating: IR} = 25 \left(0.095 - \frac{\text{interceptions}}{\text{attempts}} \right)$$

$$\text{Overall Rating} = 100 \left(\frac{\text{CR} + \text{YR} + \text{TR} + \text{IR}}{6} \right)$$



For: Information about quarterback ratings
Web Code: ape-9031